



Mobility in a Smart City

EUWP Workshop

From Energy Efficient Buildings to Smart Cities: How to Address the
Challenge of Urban Energy Consumption

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- II. Overview of IA-HEV current activities and international cooperation
- III. Activities in Austria – alternative propulsion systems and fuels
 - Deployment/Demonstration Programs
 - Research programs
 - ITS World Congress- Vienna

General aspects of urban mobility

Trends and related problematic (key aspects):

- Urbanization and increasing living standards in dense populated areas leading to:
- Congestion, GHG emissions and pollution in a context of limited fossil fuel resources and increasing energy consumption

Possible measures:

- City planning coordinated with transport capacity
- Urbanization which takes into account walk and cycle paths and grows along/around public transport stations

General aspects of urban mobility

Possible measures (cont.):

- Transport management/Intelligent transport systems (ITS)
- Public vs. individual transport
- Individual transport: alternatives by bicycle, walking and car sharing as well as multimodality (e.g. last mile individual transport)
- Reduce transport demand by reducing the need of physical travel

General aspects of urban mobility

Possible measures (cont.):

Alternative fuels and drivetrains and further optimisation of conventional drive trains:

- ICE fuelled with Biofuels (Bioethanol/Biodiesel/Biogas)
- ICE fuelled with natural gas and/or hydrogen
- Electric mobility (HEVs, PHEVS, EREVs, BEVs, FCVS)

E-mobility

- E-mobility (HEVs, PHEVs, EREVs, BEVs, FCVS)

Suitability of electric mobility for urban transport:

- Reduced or zero local emissions (in the case of electricity from renewable energy sources WTW GHG emissions would be drastically reduced)
- Reduced autonomy compared with conventional drive trains (EREVs, BEVs)
- Fleets (logistics and car sharing)

Overview IA-HEV

- Produce objective information for policy and decision makers on H&EV technology, projects and programs, and their effects on energy efficiency and the environment
- Disseminate this information to the IEA community, national governments, industries, and others
- Collaborate on pre-competitive research projects, and investigate the need for further research in promising areas
- Collaborate with transport related IAs, and with specific groups or committees

Overview IA-HEV

Executive Committee: 17 member countries

Austria		Germany		Sweden	
Belgium		Ireland		Switzerland	
Canada		Italy		Turkey	
Denmark		Netherlands		UK	
Finland		Portugal		USA	
France		Spain			

Overview IA-HEV – current activities

Vehicles

Plug-in Hybrid Electric Vehicles
Life Cycle Assessment of EVs

Components

Electrochemical systems
EV system integration

Information
exchange

Market deployment

Lessons learned
EV ecosystems
Quick charging technology

IA-HEV – cooperation activities

- EVI: Electric Vehicle Initiative within The Clean Energy Ministerial (CEM) - a high-level global forum to promote policies and programs that advance clean energy technology, to share lessons learned and best practices, and to encourage the transition to a global clean energy economy.
- http://www.cleanenergyministerial.org/our_work/electric_vehicles/index.html
- Participating governments include China, Denmark, Finland, France, Germany, India, Japan, Portugal, South Africa, Spain, Sweden, the Netherlands, United Kingdom, and the United States.
- IEA facilitates and coordinates the collection, analysis and dissemination of EVI data.

IA-HEV: Information Exchange

- Task 1
- New website: www.ieahev.org
- Annual report
- Newsletter
- Bi-annual Member States meetings

IA-HEV – Task 18

- EV ecosystems

- <http://www.evecosystems.com/>

Operating Agent: Urban Foresight (UK)

- Objectives:

- Register and promote examples of international best practice and innovative approaches in the design and development of EV ecosystems
- Shape a global vision on the technologies, policies, markets and commercial structures required to integrate EVs into future smart cities



IA-HEV – Task 18: EV Ecosystems

- ‘Hard Infrastructure’

e.g. recharging points, smart grids, buildings, transport systems

- ‘Soft Infrastructure’

e.g. ICT, regulation, business models, incentives, skills, community engagement

Work program:

- World EV Cities Web Portal operational from early 2012 developed at University of California - Davis to connect international experts and facilitate policy exchange and problem solving.

IA-HEV – Task 18: EV Ecosystems

- International Roadmap for EV Ecosystems to be published by end of 2012: identification of 100 ideas from around the world, showcasing pioneering projects and establishing an expert view of the emerging challenges and opportunities in EV markets, technologies and services.
- Foresight workshops assembling experts from municipalities, regional authorities, governments and industry to establish future priorities for EV programs and specific areas of opportunity including business models, social change and smart grids.
- World EV Cities Congress 2012

World Electric Vehicle Cities and Ecosystems Conference

May 5, 2012 in Los Angeles

International conference: agency decision makers, business executives, and non-profit leaders will discuss best practices and innovative solutions for the deployment of plug-in electric vehicles (PEVs).

Selected invited cities include:

Amsterdam, Los Angeles, Barcelona, Melbourne, Hamburg, Paris, Houston, Portland, Kanagawa (Japan), San Diego, Lisbon, Shanghai, London, Stockholm

World Electric Vehicle Cities and Ecosystems Conference – May 2012

Panel topics include the following:

- Re-designing parking and road systems for EVs
- Options for financing and managing public charging stations
- Integrating EVs into municipal fleets and public transportation
- Public planning for electrifying commercial fleets and taxis
- Enhancing public engagement through EV rentals and tourism
- Re-assessing the EV goals and strategies of non-profits, foundations, and governments

World Electric Vehicle Cities and Ecosystems Conference – May 2012

Panel topics include the following (cont.):

- Re-designing public policy incentives for EV and EVSE adoption
- Measuring performance towards EV goals: data, pilot projects & information sharing

Austrian activities and programs: Transport sector

Surface transport:

- Klima:aktiv mobil
- National implementation plan (E-Mobility)
- Model regions (E-mobility)
- LTPI – Lighthouse Projects Initiative (E-mobility)
- Research:
 - A3plus, I2V, Ways2go (Umbrella program IV2Splus)
 - Energy efficient technologies (Automotive)
- Public Private Partnership: A3PS
- ITS World Congress

Austria: current fleet distribution

Alternative drivetrains and fuels:

Fleet distribution by drive train (passenger cars) as of 31.12.2010	
Drive train	Total
Gasoline	1.983.936
Diesel	2.445.506
Electric	353
LPG	1
Natural gas	1.312
Bivalent Gasoline/Ethanol (E85)	4.143
Bivalent Gasoline/LPG	87
Bivalent Gasoline/Natural Gas	897
Hybrid Gasoline/Electric	4.792
Total	4.441.027

Austria: alternative fuels infrastructure

Filling stations for alternative fuels - status 2011	
Fuel	Total
CNG	146
Biogas	1
E 85	28
Vegetable oil	19

Source: <http://www.raiffeisen-leasing.at/tankstellen.html>

Austria: Legal framework

Biofuel substitution:

The biofuel substitution goal set by the Fuel Regulation (Kraftstoffverordnung) approved on January 1st 2009, sets a share of 5,75% (energy content) of the total Otto and Diesel fuels consumption in Austria.

For the year 2010, the 5,75% goal was exceeded reaching a share of biofuels of 6,58% although in 2009 the share reached 7%. This decrease was explained with a lower demand of biodiesel in commercial fleets.

Source: Umweltbundesamt “Biokraftstoffe im Verkehrssektor 2011”

Austria: Taxation

Starting from July 2008, a new bonus-malus system for CO₂, NO_x and particle emissions was introduced for the taxation on the acquisition of new vehicles (NoVA - Normverbrauchsabgabe).

An increase of the NoVA-Malus applies from January 1st, 2011 through December 31st, 2012:

- over 160 g/km 25€/g CO₂
- over 180 g CO₂/km increased from 25 to 50€/g CO₂
- over 220 g CO₂/km increased from 25€/g CO₂ to 75 €/g CO₂

A further increase will be applied from January 2013 onwards

Austria: Taxation

NoVA (cont.)

NOx emissions: gasoline vehicles with emissions not higher than 60 mg/km (in the case of diesel vehicles not higher than 80 mg/km) and particle emissions not higher than 0,005 g/km, receive a tax reduction of maximum 200 €.

Vehicles running on alternative fuels such as E 85, CNG and LPG or hybrid vehicles, obtain a reduction of maximum 500 €. This measure will be applied until the end of August 2012.

Klima:aktiv mobil

This initiative was launched in 2004 by the Federal Ministry of Agriculture, Forestry, Environment and Water Management in the context of the Austrian Federal Climate Strategy.

klima:aktiv mobil supports measures focusing on mobility management, including alternative vehicles and renewable energy, intelligent multimodal mobility, ecodriving, cycling, walking, demand-oriented public transport and public awareness.

Klima:aktiv mobil

Klima:aktiv mobil - Areas of the Mobility Management Program:

- Cities, municipalities and regions
- Companies, real estate developers and public administrations
- Leisure, tourism and youth
- Children, parents and schools
- Eco-Driving Initiative for fleet operators

Klima:aktiv mobil

- Within this program, funds for “mobility management for commercial and public fleets” support different measures that target the reduction of CO₂ and pollutant emissions; they cover up to 30% of the total investment costs and up to 50% of operational costs and externally provided intangible services.
- A special initiative within this program (“Sonderaktion E-Ladestation”) will operate until July 2012, providing funds for the installation of charging stations, with the maximum number of stations being 50 per project and 1,000 in total. An overview of charging points already in operation in Austria through this and other initiatives can be found at <http://www.e-tankstellen-finder.at/>

Deployment - demonstration projects

Austrian Climate and Energy Fund: deployment and demonstration programs

- E-mobility - Model Regions
- E-mobility - Lighthouse Projects Initiative

Model Regions:

- o Regional implementation of market ready technology in an urban agglomeration by an integrative mobility concept including the installation of the necessary charging infrastructure supplied with renewable energy
- o The procurement and integration of electric vehicles in the regional transport system (public and commercial passenger transport, transport of goods and bicycles)
- o The analysis of data obtained from operation within the model region

Electric mobility - Lighthouse Projects

- Funding instrument of the Ministry for Transport, Innovation and Technology to support the **market introduction** of new technologies through demonstration.
- Goals:
 - **Optimization of electric vehicles and infrastructure** under real life conditions through a close cooperation between developers and users
 - **Public awareness and preparation for technological change**

Current projects:

- eMORAIL (www.emorail.at): pilot project for the integration of e-car sharing models for “last mile” within public transport systems (service for commuters in two rural regions and two cities)

E-mobility Lighthouse projects:

- Clean Motion OÖ: the project aims at developing cost-effective components for the automotive industry as well as easing the utilization of related infrastructure.

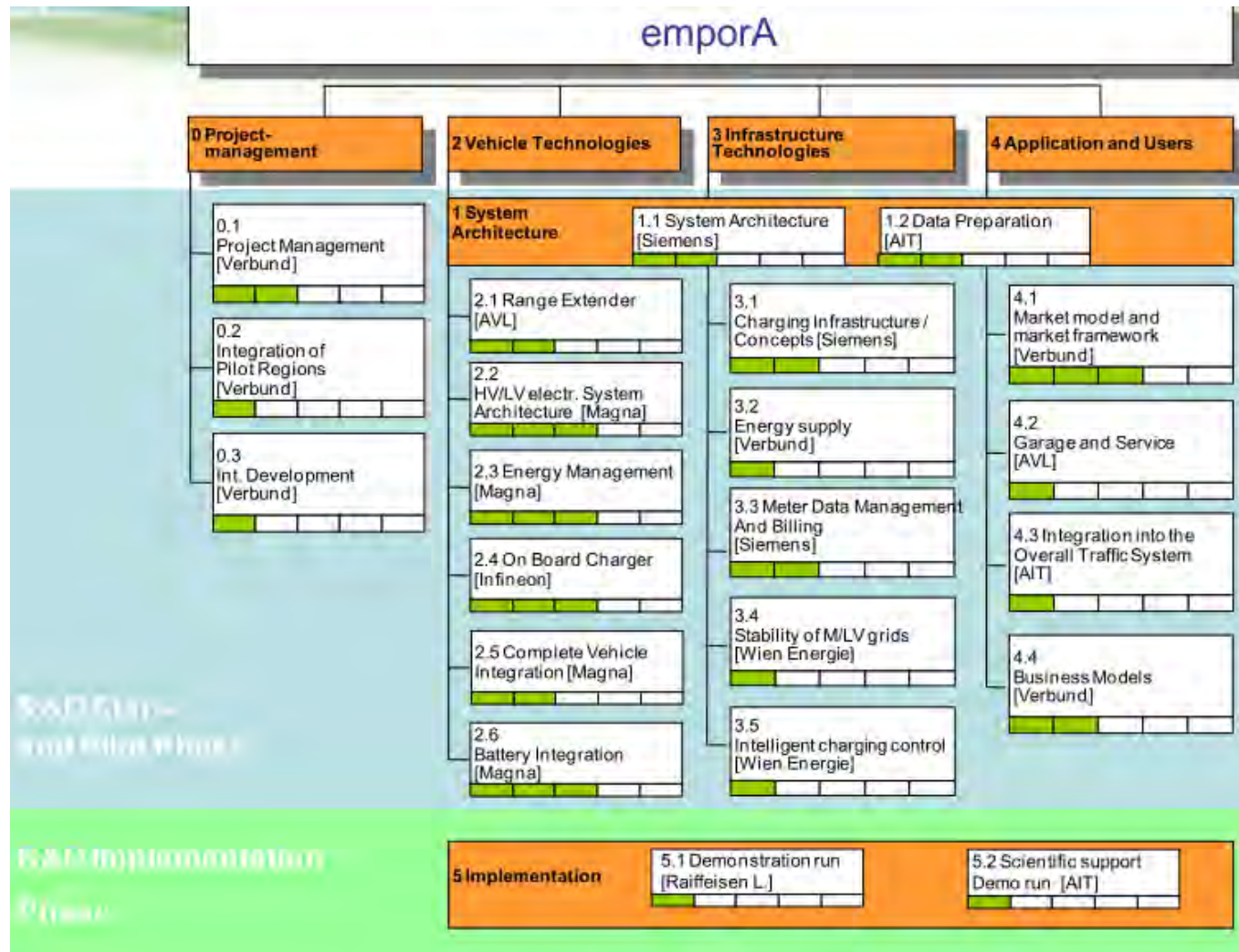
Areas:

- traction battery and other energy storage systems (e.g. flywheel)
- range extender on renewable fuels
- vehicle and battery data pool, including centralized analysis
- load management: infrastructure solutions for operation of electric vehicles within fleets
- plug-less charging interface and centralized billing system
- business models
- inter-company fleet management

E-mobility Lighthouse projects:

- emporA:
 - Period 2010-2012, total budget of 21 Million € (8,8 Million € financed by the Climate and Energy Funds)
 - 22 working packages grouped in
 - Vehicle technology
 - Infrastructure
 - Applications and users

E-mobility Lighthouse projects:

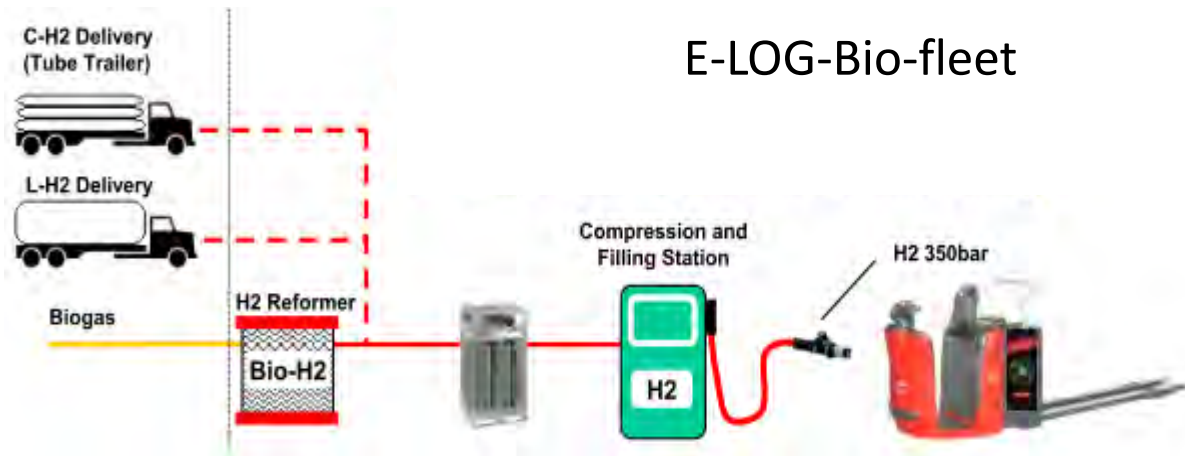


E-mobility Lighthouse projects:

E-LOG-Bio-fleet:

- Development, certification and demonstration of a warehouse tow truck fleet (15 vehicles) with fuel cell range extender
- Installation, authority approval and demonstration of indoors and onboard bio-hydrogen refueling of the warehouse truck fleet
- CO₂ neutral generation of bio-hydrogen from reformed biogas as source of energy
- Environmental and socio-economic assessment of the innovative and sustainable warehouse logistic application
- Preparation for enhanced market entry

E-mobility Lighthouse projects:



E-mobility model regions

1. VLOTTE (Rheintal – Vorarlberg)
2. Salzburg
3. Vienna
4. Graz
5. Eisenstadt

Model regions: Vienna

Regional model “e-mobility on demand” coordinated by the Vienna Public Utilities (Wiener Stadtwerke)

Goals:

- To establish a comprehensive, user-oriented electrical mobility service for the Vienna area
- Reduce private individual transport, encourage changes in mobility behaviour and lower pollution. The share of public transport should be increased with electrical mobility established as an extension to it

Strategies:

Mobility junctions where modal transfer takes place: e.g. Wien Westbahnhof: Intercity and regional trains, underground, tram, bus, park & ride, bike ride, car sharing, taxi and car rental companies.

Model regions: Vienna

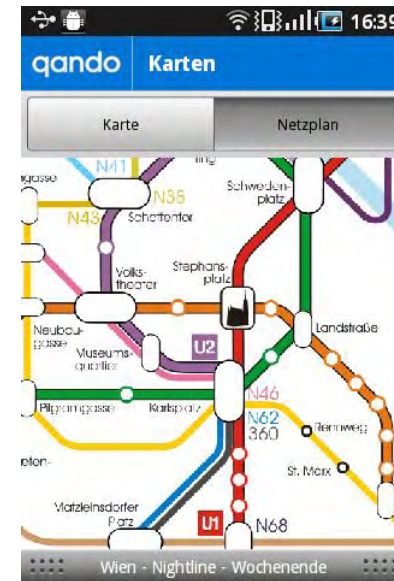
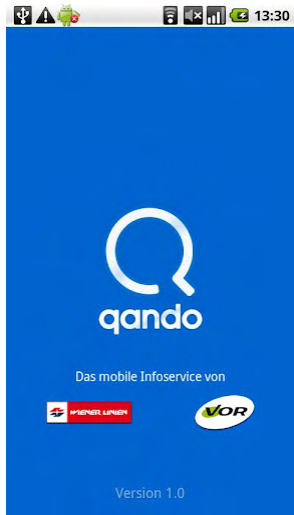
Strategies (cont.):

Further junctions will be implemented involving university campuses, a Park & Ride facility, residential areas and corporate fleets each with their specific mobility needs.

Tools:

- Free information to the customer about his ideal mobility options, integrated information channels and control systems are being created for improved networking of all services (e.g. real-time mobile application **quando**)
- Development and test of a multimodal “Smart Mobility Card”: access, control, information and billing tool for a comprehensive mobility package (from e-bike or electric car to underground or bus services) integrating in this way electric mobility to public transport.

Model regions: Vienna



E-mobility implementation: progress

1. Vienna plans the implementation of 10-20 electric buses for the city center starting in 2012 (Call closed in September) to exchange the current bus fleet operated with CNG. Tested in July: Siemens, BredaMenarinibus, Solarbus Kutsenits, SOR Cegelec
2. EV Car sharing - Vienna: “Denzel Mobility Carsharing GmbH” EV fleet consists currently of 3 vehicles „Think City“ (from autumn on to be extended to 10). Costs: 29 Euro/day and 0,15 Euro/km for customers with train discount cards. Source: www.vienna.at
3. Post: the fleet counts with a total of 9.000 vehicles (ca. 7.000 LD/HD vehicles, 1.000 mopeds and 1.000 bicycles). Test with EVs were already performed in pilot regions and the acquisition of 175 electric two-wheelers and 18 EVs is planned for 2011.

Austria: Research programs

iv2splus
.....

Strategy Programme
Intelligent Transport Systems and Services plus
2007 - 2012

Impulse Programme

a3plus
.....

Alternative
Propulsion Systems
and Fuels

Impulse Programme

i2v
.....

Intermodality and
Interoperability of
Transport Systems

Action Line

ways2go
.....

Technologies for
Changing
Mobility Demands

Initiative

**Infrastruktur
im Verkehr**

Adaption Infrastruktur
in Betrieb und
Wartung

European Research Area Network
ERA-NET TRANSPORT

Budget 2007-2012: 46 million €

Austria: Research programs

1. Ways2go: focus on personal transport

The program goal is to support the development of:

- Sustainable mobility solutions adapted to undergoing social changes
- An integrative accessible (involving all social/age groups, people with disabilities) and environmentally friendly transport system

through innovations for the social and technical problematic posed by transport systems

Austria: Research programs

2. I2V: intermodality and interoperability of transport systems

This program supports the development of intermodal and interoperable transport systems.

Priority areas:

- Transport management involving different modes/carriers
- Intermodal freight transport
- Intelligent logistics
- Intermodal/Co-modal solutions with focus on the shift from road freight transport to rail and inland waterways

Austria: Research programs

3. A3plus - Program goals:

Promotion of cooperative RD&D projects for innovative propulsion technologies and alternative fuels for all surface transport vehicles - annual calls for proposals

Topics:

- Alternative propulsion systems and components
- Alternative fuels
- Innovative storage concepts for gases, liquids, electricity
- Development of necessary supply infrastructure for alternative propulsion systems
- Vehicle electronics for energy efficient system management and control

A3PS: Austrian Agency for Alternative Propulsion Systems



Institut für Verfahrenstechnik,
 Umwelttechnik und
 Technische Biowissenschaften



BIOVEST CONSULTING



ITS World Congress - Vienna

October 22nd-26th, 2012 / www.itsworldcongress.at

- **3** Plenary Sessions
- **12** Executive Sessions
- **74** Special Interest Sessions
- **120** Technical/Scientific Sessions
- **10** Interactive Sessions
- Demonstration activities in 5 areas: Cooperative Mobility, E-Mobility, Navigation, Public Transport and Network management & Operation

ITS World Congress - Vienna

Demonstration activities: E-mobility

- **emporA** – Novel Routing Methods for Electric Vehicles (demonstration of a prototype for energy-dependent routing)
Austrian Mobile Power (AMP)
- **EMF Train** – fuel cell driven vehicles that can be linked to a train
HET Hochleistungs-Eisenbahn- und Transporttechnik Entwicklungs GmbH
- **eMORAIL** – sustainable linking of eMobility services and sharing models in the first/last mile with public transport
ÖBB-Holding AG
- **BALLADE/SPITS** – demonstration of a charging infrastructure and driver assistance systems
Cirquent GmbH

ITS World Congress - Vienna

Main topics - Executive Sessions

- Advanced Traffic Management – extending utilization of infrastructure capacity
- Green and Intelligent Travel Society
- Doing more for less – Public Sector Investment Programs
- ITS for sustainable mobility
- Future Trends in Urban Mobility
- ITS for Integrated Transport System enabling seamless multimodality
- Global safety – Impact of Cooperative Services

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